

WHAT IS CLAIMED IS:

- 1. A surface plasmon resonance sensor comprising:
a prism having a surface on which a metallic layer is coated;
a metallic nanoparticle layer formed on the metallic layer;
a light source giving off a light to the prism, the light being reflected by the
surface of the prism to form a reflected light; and
a light detector for detecting the reflected light.**
- 2. The surface plasmon resonance sensor according to claim 1 further comprising a
dielectric layer coated on the metallic nanoparticle layer.**
- 3. The surface plasmon resonance sensor according to claim 1, wherein the light
source comprises a semiconductor laser array for radiating multiple laser beams,
a polarizing device and a half-wave plate for adjusting polarized components of
the laser beams.**
- 4. The surface plasmon resonance sensor according to claim 1 further comprising a
spectral prism for splitting the reflected light into polarized transverse magnetic
light wave and transverse electric light wave.**
- 5. The surface plasmon resonance sensor according to claim 1, wherein the metallic
layer comprises gold.**
- 6. The surface plasmon resonance sensor according to claim 1, wherein the metallic
layer comprises silver.**
- 7. The surface plasmon resonance sensor according to claim 1, wherein the metallic
layer has a thickness of approximately 50 nm.**
- 8. The surface plasmon resonance sensor according to claim 1, wherein the metallic
nanoparticle layer comprises at least nanometer order grains selected from a
group consisting of gold, silver and platinum.**
- 9. The surface plasmon resonance sensor according to claim 1, wherein the metallic
nanoparticle layer comprises nanoparticle having a diameter of approximately
1-50 nm.**

10. The surface plasmon resonance sensor according to claim 1, wherein the metallic nanoparticle layer has a thickness of approximately 1-50 nm.
11. The surface plasmon resonance sensor according to claim 1, wherein the metallic nanoparticle layer is formed by means of co-sputtering.
12. The surface plasmon resonance sensor according to claim 8, wherein the metallic nanoparticle layer comprises a material selected from a group consisting of polymethyl methacrylate (PMMA) and silicon oxide.
13. The surface plasmon resonance sensor according to claim 1 further comprising a self assembled monolayer adjacent the metallic nanoparticle layer.
14. The surface plasmon resonance sensor according to claim 13, wherein the self-assembled monolayer comprises at least one of functional groups and molecule selected from a group consisting of SH, NH₂, CHO, COOH, and Biotin.
15. A method for detecting properties of substance by using a surface plasmon resonance sensor, the method comprising the following steps:
 - (a) preparing a surface plasmon resonance sensor comprising a prism having a surface on which a metallic layer is coated, a metallic nanoparticle layer formed on the metallic layer, a light source giving off a light to the prism, the light being reflected by the surface of the prism to form a reflected light and a light detector for detecting the reflected light;
 - (b) preparing a self-assembled monolayer on surface of the metallic nanoparticle layer of the surface plasmon resonance sensor;
 - (c) preparing a sensing layer immobilized onto the self assembled monolayer for reacting with said; and
 - (d) contacting said substance with the sensing layer.
16. A method for detecting properties of substance by using the surface plasmon resonance sensor, the method comprising the following steps:
 - (a) preparing a surface plasmon resonance sensor comprising a prism having a surface on which a metallic layer is coated, a metallic nanoparticle layer formed on the metallic layer, a light source comprising a semiconductor

laser array for radiating multiple laser beams, a polarizing device and a half-wave plate for adjusting polarized components of the laser beams, and light detector for detecting a reflected light formed by reflecting the laser beams by the surface of the prism;

- (b) preparing a self-assembled monolayer on surface of the metallic nanoparticle layer of the surface plasmon resonance sensor;
 - (c) preparing a sensing layer immobilized onto the self assembled monolayer for reacting with said; and
 - (d) contacting said substance with the sensing layer.
17. A method for detecting properties of substance by using the surface plasmon resonance sensor, the method comprising the following steps:
- (a) preparing a surface plasmon resonance sensor comprising a prism having a surface on which a metallic layer is coated, a metallic nanoparticle layer formed on the metallic layer, a light source giving off a light to the prism, the light being reflected by the surface of the prism to form a reflected light, a spectral prism for splitting the reflected light into polarized transverse magnetic light and transverse electric light wave and a light detector for detecting the polarized waves;
 - (b) preparing a self-assembled monolayer on surface of the metallic nanoparticle layer of the surface plasmon resonance sensor;
 - (c) preparing a sensing layer immobilized onto the self assembled monolayer for reacting with said; and
 - (d) contacting said substance with the sensing layer.